



STATE OF NEW HAMPSHIRE DEPARTMENT OF SAFETY

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TECHNICAL BULLETIN AND POLICY **Installation of Wiring Methods in Modular Homes**

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The Bureau of Electrical Safety and Licensing has become aware that a manufacturing process used to install branch circuit wiring within modular homes had produced situations where Nonmetallic Sheathed Cable (NM Cable) is subject to physical damage. The following information is intended to provide an awareness of the hazard and identify National Electrical Code (NFPA 70-2005) (NEC) deficiencies.

Some modular home manufacturers use a process where the branch circuit wiring between device and outlet boxes, panelboards and other equipment is installed by notching the outer edge of outside wall studs and tops of ceiling joists. The NM Cable branch circuit wiring is then laid in the notch and a nail plate is provided to protect the wiring from physical damage from nails, screws or other fasteners used to secure sheathing or sub-flooring. In this application the nail plate provides protection against physical damage at the notch location and, therefore, the installation is in compliance with 300.4 (A) (2). Note that this section requires a nail plate, which is the appropriate length and width to cover the entire area of the wiring, regardless of the depth of the notch. However, the area of concern in this technical bulletin is not the area where the cable is laid in the notch but the area between the studs or the ceiling/floor joists.

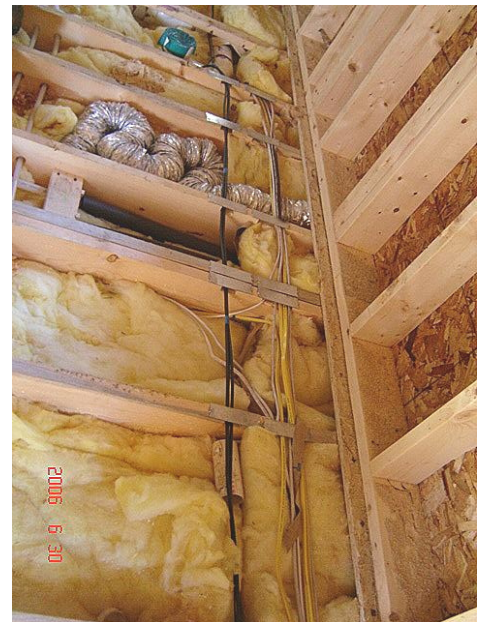
The picture to the right illustrates the process of notching the outside edge of the wall studs. This practice can result in a condition where the NM Cable is extremely susceptible to physical damage as it ends up against, or in close proximity to, the inside surface of the sheathing. The likelihood of damage to the NM Cable increases significantly when thermal insulation is installed in the wall cavity as it forces the NM Cable directly against the inside surface of the sheathing.



These pictures identify an actual installation in modular home where a staple used to secure the siding to the structure completely penetrated the NM Cable. They are examples of the type of physical damage created by the manufacturing process in question.



Similarly, when the tops of floor/ceiling joists are notched and the NM Cable is run at right angles to the floor/ceiling joists through the notches, areas of physical damage can result between the floor/ceiling joists. Where installation practices such as this are utilized, a nail plate can be placed at the notch location to protect the NM Cable and the installation would be in compliance with 300.4 (A) (2). However, the NM Cable may end up against, or in close proximity to, the sub-flooring between the joists. In this case, the NM Cable becomes subject to physical damage where nails, screws or other types of fasteners penetrate the sub-flooring when a leveler or finish flooring is secured to the sub-flooring. As depicted in this illustration, when thermal insulation is placed between the floor/ceiling joists the likelihood of damage to the NM Cable increases significantly as it keeps the NM Cable in close proximity to the underside of the sub-flooring.



It is the opinion of the Bureau of Electrical Safety and Licensing that NM Cable installed as described above is subject to physical damage in the area between the wall studs or floor/ceiling joists and therefore is in violation of 300.4. Although there is no mention of the specific conditions described above in 300.4, the main requirement of this Section is to provide protection for conductors that are subject to physical damage. There are many ways to address the above described physical damage issues. However, at a minimum, a method that results in the degree of protection provided by the nail plate described in 300.4 (A) (2) should be used to protect the cable from penetration by nails, screws or other fasteners or an installation practice that keeps the NM Cable an acceptable distance from the inside of the sheathing or underside of the sub-floor should be utilized. The “acceptable distance” will be one that allows the wiring method to be far enough back so the nails, screws or other fasteners will not damage the wiring under normal conditions. Obviously, this will be based on the specific manufacturing condition.